

SYSTEMS AND METHODS FOR CHARACTERIZING LASER BEAM QUALITY

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5 ABSTRACT OF THE DISCLOSURE

A measure of the quality of a laser beam is obtained by comparing the power of a theoretical Gaussian beam through a (certain sized area) pinhole to the power of a test beam through a same sized (area) pinhole. The 10 theoretical surrogate Gaussian beam with the same second moment of intensity as the test beam is used to determine the "bucket size" used in "power-in-the-bucket" techniques. The bucket size is an interaction area determined by the wavelength of the laser light, the 15 focusing distance, and the $1/e^2$ radius of the near field intensity. The beam quality is determined by taking the square root of the ratio of the theoretical power through a bucket and the actual power through a pinhole with the same size as the bucket. The beam quality of different 20 types of beam profiles can be obtained with a single method or measure.